Wireless Strategies Inc.

Ex parte Meeting

NPRM WT Docket 10-153

December 8, 2010

Benefits of Allowing Auxiliary Stations

- Every Auxiliary Station Deployed will Conserve 60MHz – 80MHz of Spectrum.
- Auxiliary Stations will not block any new paths.
- Auxiliary Stations Operating TDMA will for the First Time make it Economically Viable for Part 101 FS Microwave to bring Carrier Grade Broadband to Un-Served and Underserved Rural and Urban communities.

NPRM Proceedings

❖ In most if not all proceedings there are the Entrepreneurs who through Innovation seek ways to improve the public good, and the Obstructionists who seek ways to delay the introduction of new technologies in order to prolong the obsolete technologies.

❖ Typical tactics employed by obstructionists are:

- Raise unsubstantiated fears of innovative technologies & techniques
- Ignore the evidence
- Base arguments on a flawed premise

Obstructionists

In the Late19th Century Obstructionists used the Red Flag Act/Laws to stifle the Emerging Automobile Industry

Obstructionists in the UK with interests in the horse-drawn carriage industry raised fears that horseless carriages would damage the highway, scare horses and disturb the locals by operating at night, and therefore invoked the Red Flag Act which restricted the speed of locomotives and automobiles to 2MPH and required a person to walk in front with a Red Flag. In 1896 the Red Flag and speed restriction were removed.

In 1896 obstructionists in Pennsylvania enacted the most infamous of the Red Flag Laws when they had legislators unanimously pass a bill through both houses of the state legislature, which required all motorists piloting their "horseless carriages" upon chance encounters with cattle or livestock to (1) immediately stop the vehicle, (2) "immediately and as rapidly as possible... disassemble the automobile," and (3) "conceal the various components out of sight, behind nearby bushes" until equestrian or livestock is sufficiently pacified. Thank goodness reason prevailed and the bill did not pass, as Pennsylvania's governor used an executive veto.

Debunking Obstructionists' Falsehoods

with the

Facts

Auxiliary Stations

Primary Stations Block Future Paths Over Large Areas[1,2]

Auxiliary Stations Will Not[3]

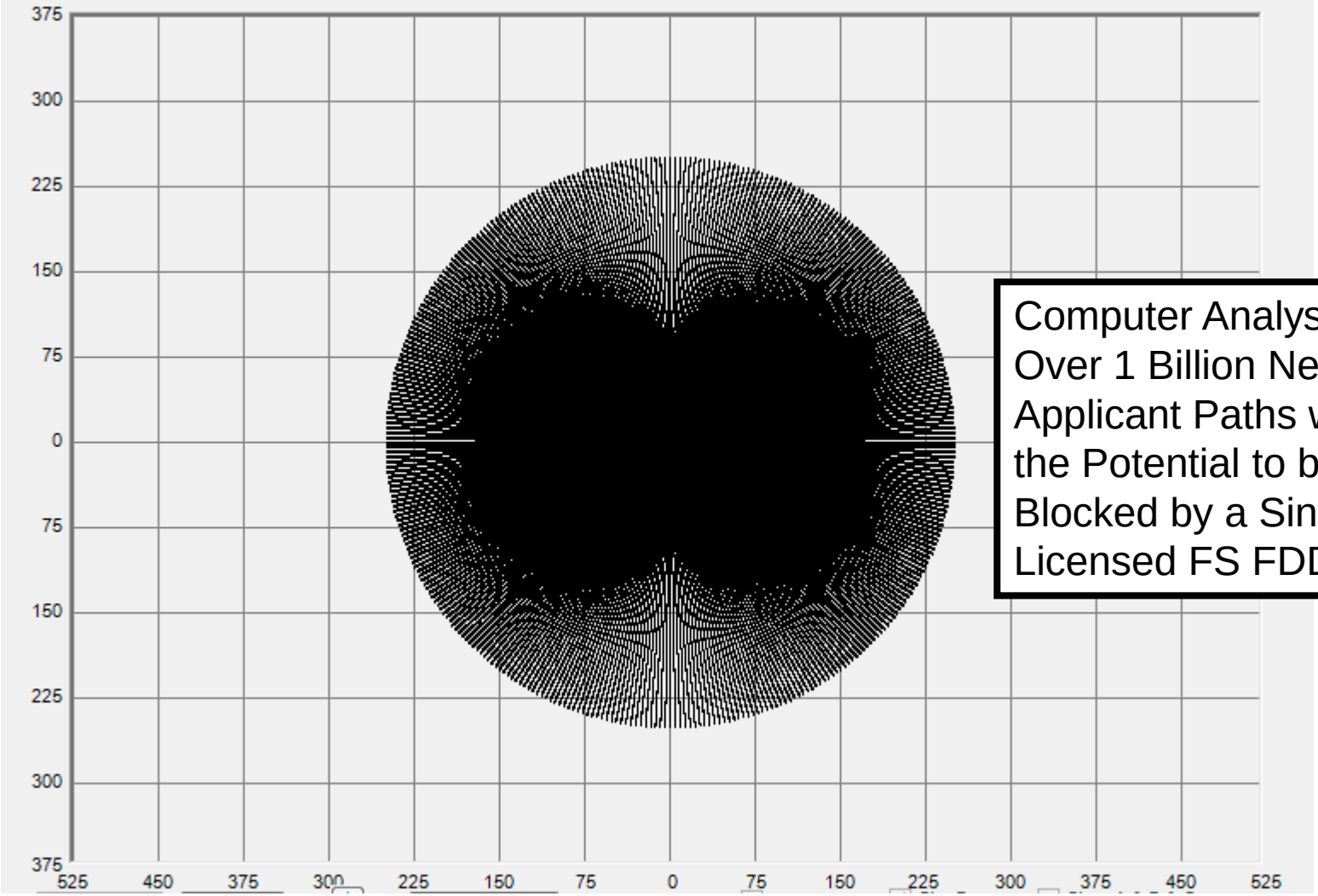
1. § 101.103 Frequency coordination procedures.

(a) Assignment of frequencies will be made only in such a manner as to facilitate the rendition of communication service on an interference-free basis in each service area. Unless otherwise indicated, each frequency available for use by stations in these services will be assigned exclusively to a single applicant in any service area.

2. TSB 10-F Annex G. Interference analysis of a new applicant station is required within 125 miles, 250 miles within 5 degrees of the main beam azimuth.

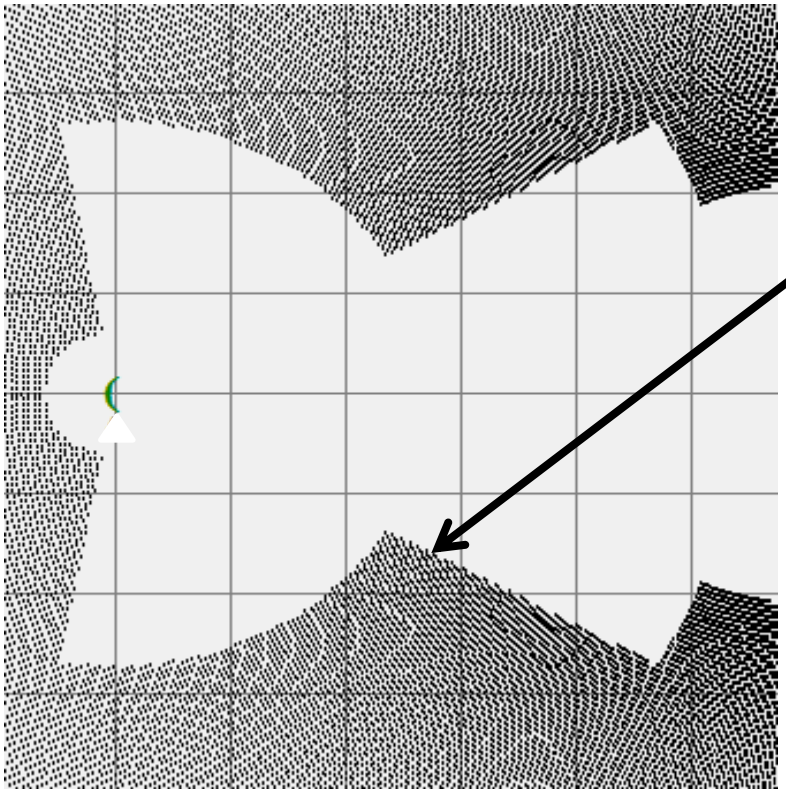
3. NPRM WT Docket 10-153, Auxiliary Stations

Licensed FS FDD Station's Potential to Block New Applicant Paths



Computer Analysis of Over 1 Billion New Applicant Paths with the Potential to be Blocked by a Single Licensed FS FDD Path

Licensed FS FDD Station's Potential to Block New Applicant Paths



Interference Contour within which a new applicant will Not Prior Coordinate as it will Cause harmful interference, but where a Licensee can Deploy an Auxiliary Station and put the Wasted Spectrum to Productive Use

Linear Distance Plot of Interference Contours

(For a given victim receiver threshold and any type of Cat A antenna)

New Licensed FS FDD Station Will Block New Applicant Paths

New Licensed FS FDD Station's Potential to Block New Applicant Paths

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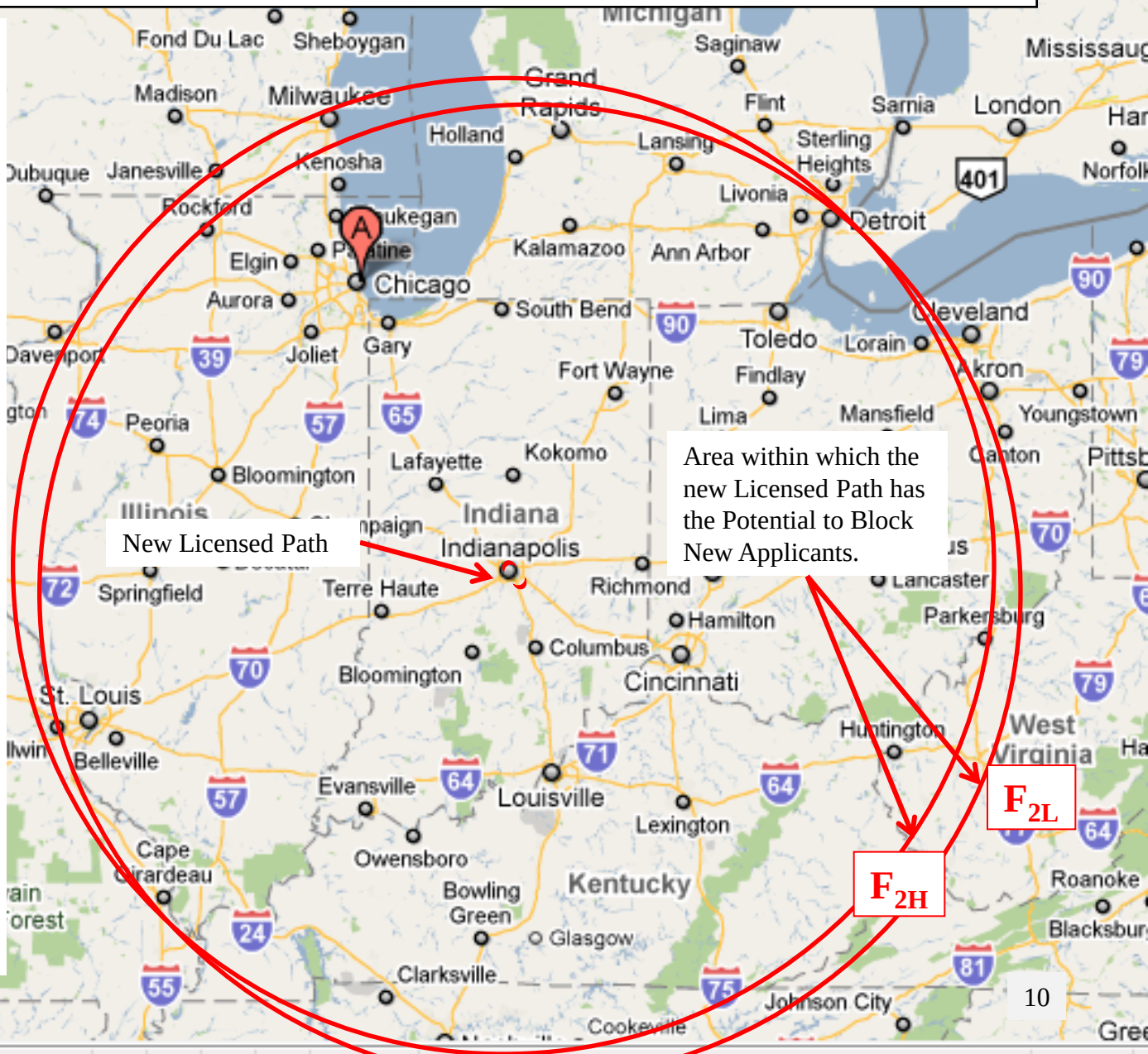
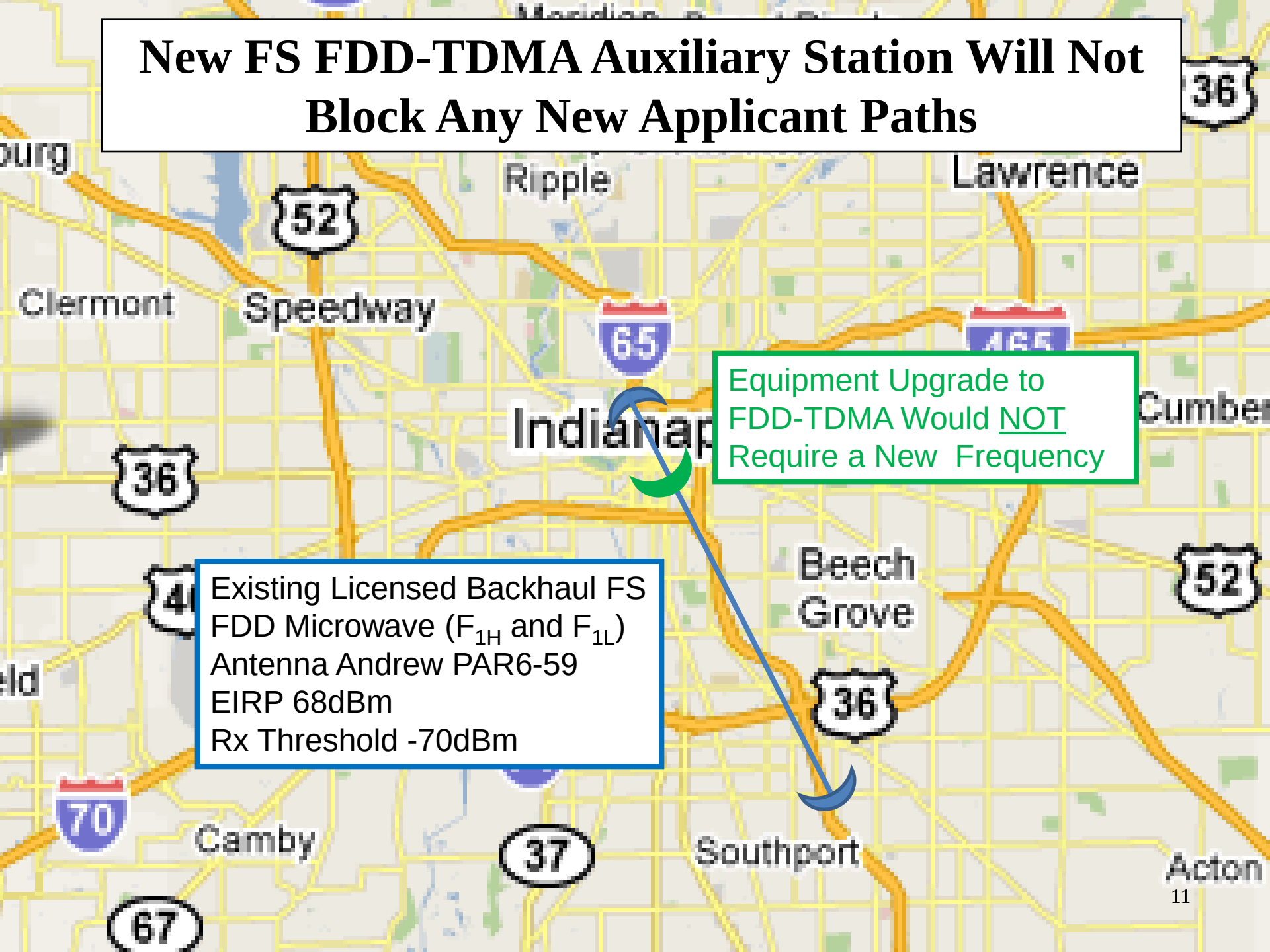


New FS FDD-TDMA Auxiliary Station Will Not Block Any New Applicant Paths

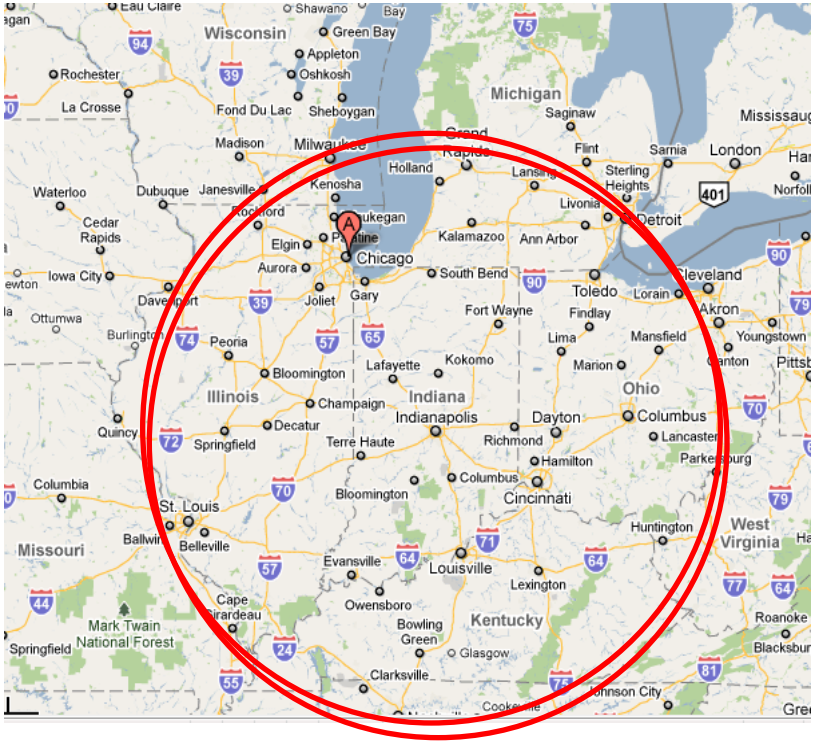


New FS FDD-TDMA Auxiliary Station Will Not Block Any New Applicant Paths

Comparison of the Use of Primary Paths and Auxiliary Paths

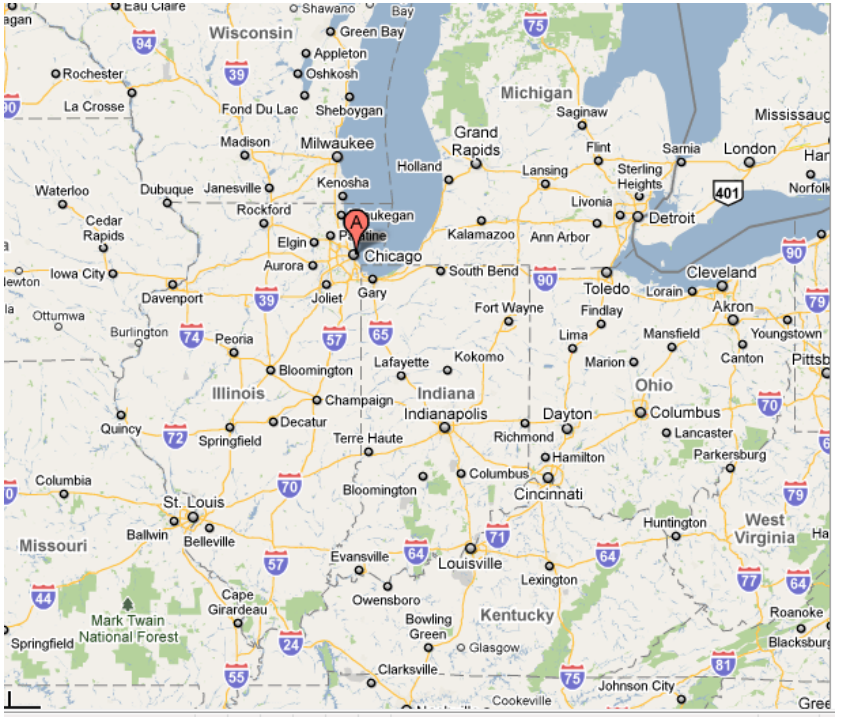
FDD Primary Station

Areas Within which a New FDD Path has the Potential to Block New Applicants



Auxiliary Station Path

No Potential Blockage of New Applicants



Summary of the Facts for this Example

	New Path	New Auxiliary Path
Equipment Type	FDD	FDD-TDMA
Reused Primary Antenna	PAR6-59	PAR6-59
EIRP	68dBm (additional)	68dBm (Reused)
Locations Served	1	2[1]
New Licensed Bandwidth Required	60MHz	None[1]
New Applicant Paths Blocked	Yes (Many)	None
Increase in Traffic Load/Unit Bandwidth	None	100%[1]

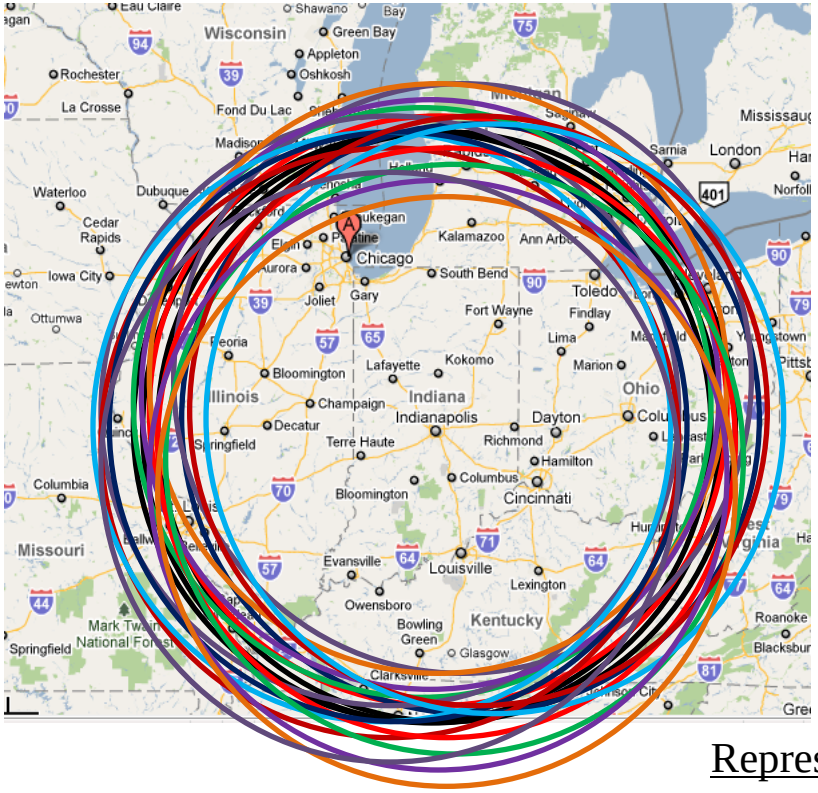
1. Could support multiple 4G base stations plus Smart Grid locations, increasing the payload by hundreds of percent, with no new bandwidth required and no new path blockage.

Frequency Reuse
Hub and Spoke Configuration

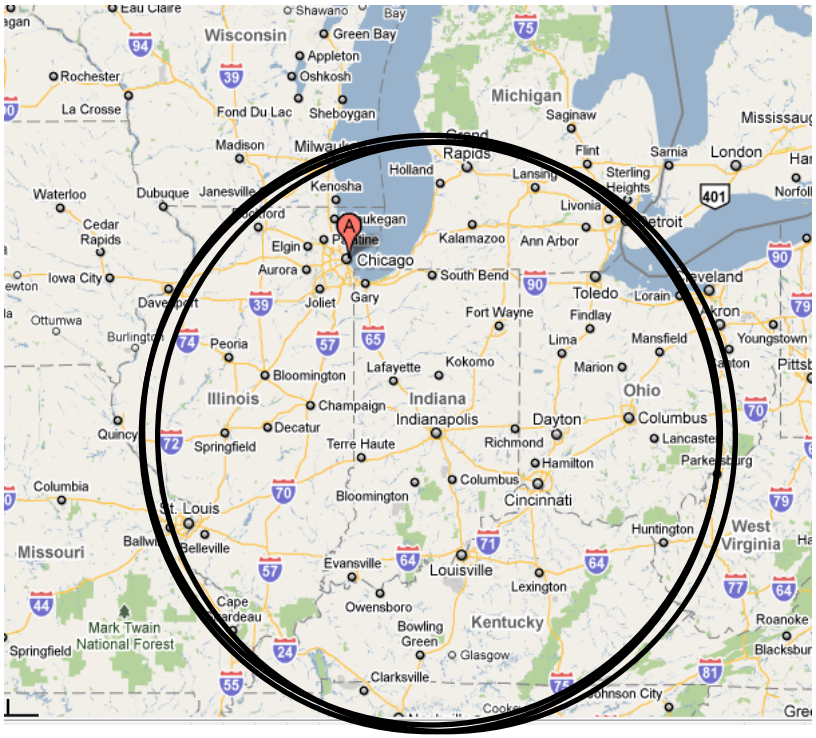
All Equipment FDD

Comparison of the Use of All Primary Paths and Primary Plus Auxiliary Paths

Eight FDD Primary Paths
Sixteen Overlaid Areas each with the Potential to Block Millions of Paths



Two FDD Primary Paths and Six Auxiliary Paths
Four Overlaid Areas each with the Potential to Block more than 1Million Paths



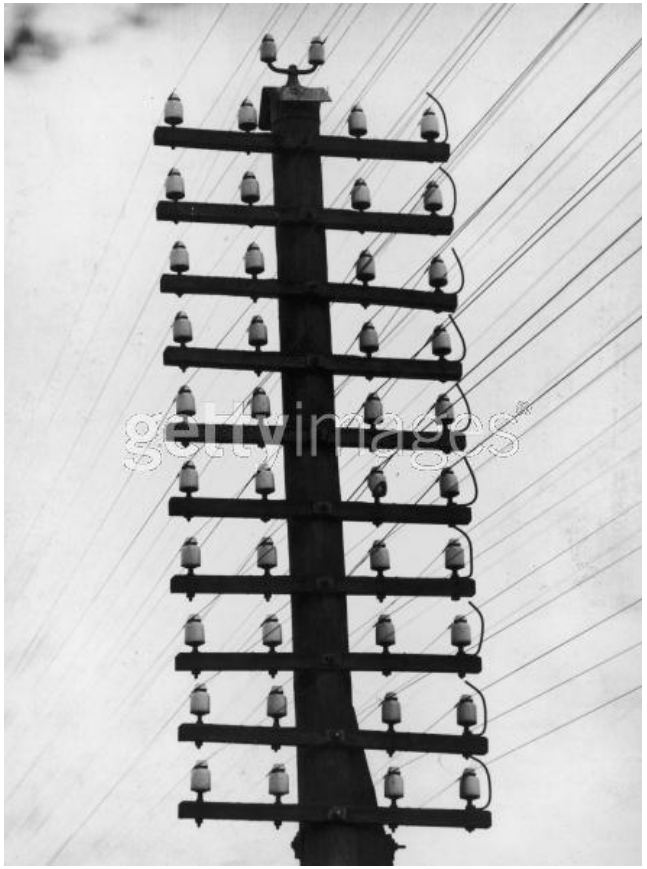
Representation

The Case for Sharing Transport Channels Copper Wire Pairs or Microwave Channel Pairs

In the 1900s individual telephone customers were connected to the Central Office via a dedicated pair of wires.

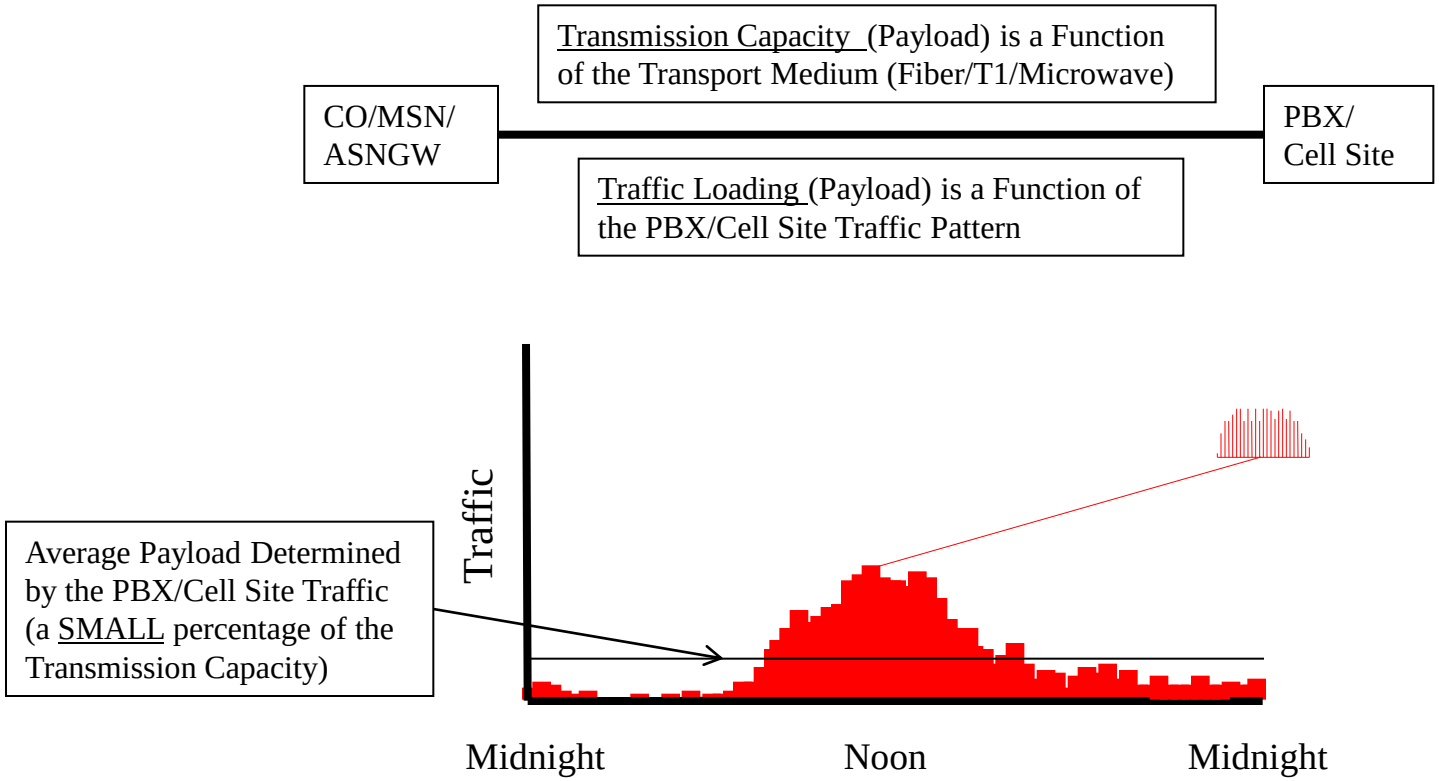
Because the wire pair were only in use for a small portion of time (average payload was very low) carrier systems[1] were introduced to take advantage of the low probability that multiple users would pick up their phone at the same time and therefore the traffic load over a single pair could be dramatically increased.

In the 1960's Time Division Multiplex (T1) carrier systems were introduced with 24 voice circuits over a pair of wires (a pair gain of 24:1).



1. "The most important advantage, in fact the justification for existence of a carrier system, is economy. This comes about by virtue of its ability to match messages to the transmission medium so as to realize more fully the information carrying potential of the latter." – Transmission Systems for Communications, Third Edition , Bell Labs Inc.

The Case for Sharing Transport Channels Copper Wire Pairs or Microwave Channel Pairs



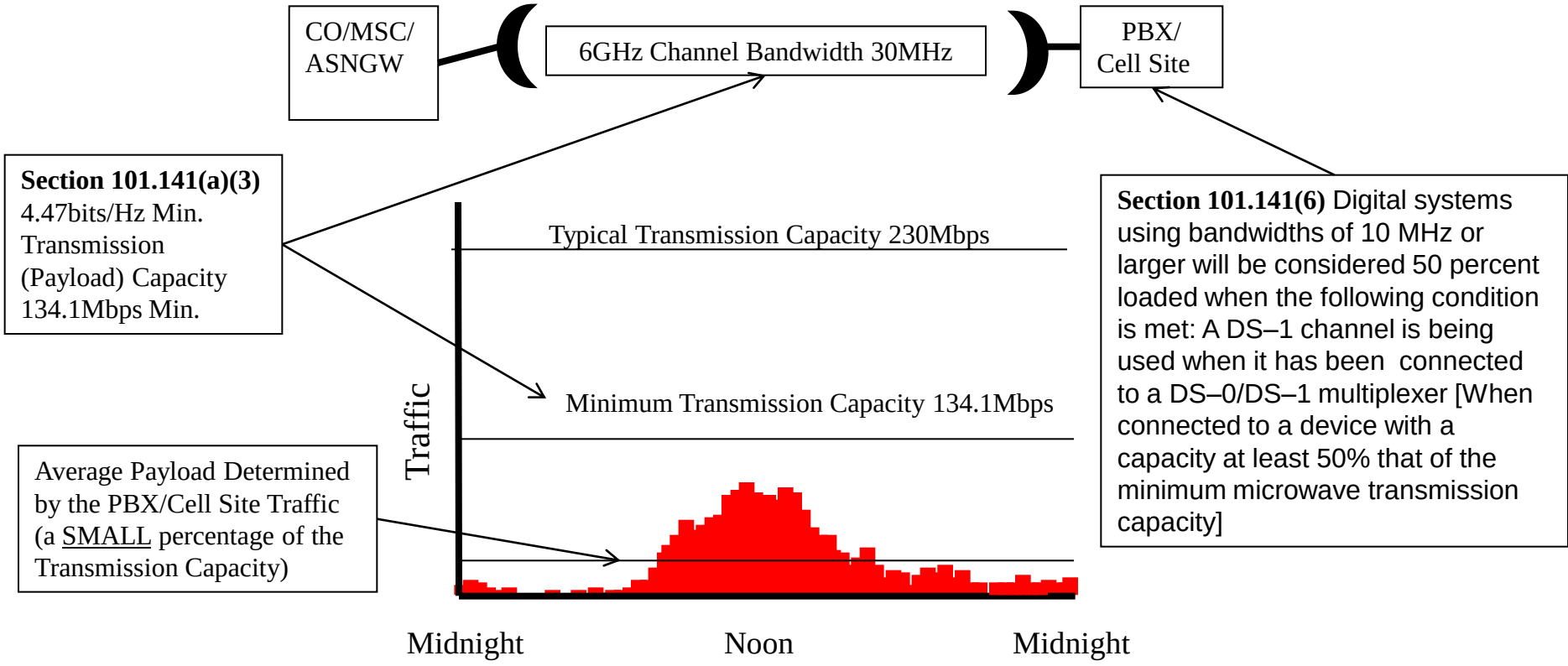
The Case for Sharing Transport Channels Copper Wire Pairs or Microwave Channel Pairs

In the 1970's Part 101 FS PTP FDD digital microwave was introduced to provide dedicated toll trunk backhaul (as with most dedicated systems the average traffic load is only a small percentage of the traffic capacity).

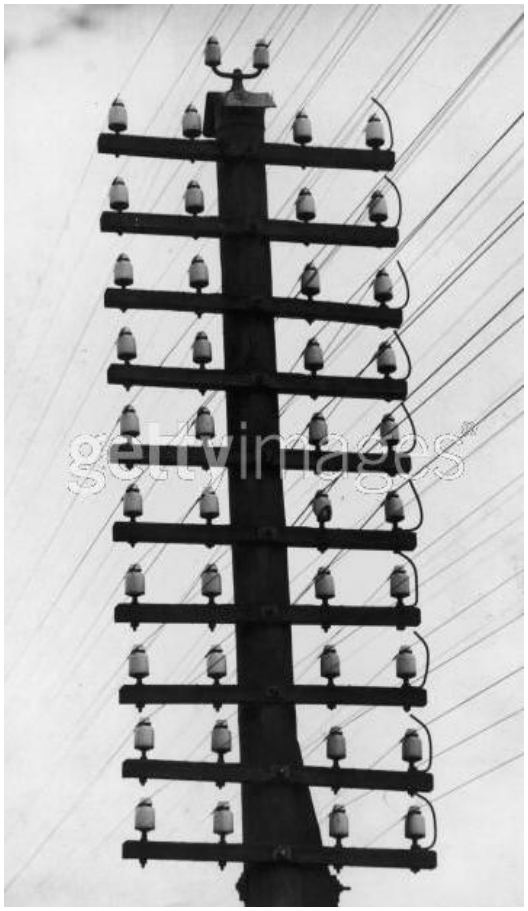
From the 1970's through to today, Part 101 FS PTP FDD microwave has been more expensive than most T1 carrier applications and too expensive for nearly all subscriber carrier applications.

Auxiliary stations with small antennas (low OPEX) and TDMA (low CAPEX) microwave will for the first time be able to solve the "Last Mile" cost barrier.

Transmission Capacity and Traffic Loading



Obstructionists' Falsehood Regarding Exclusive use of Point-To-Point FDD



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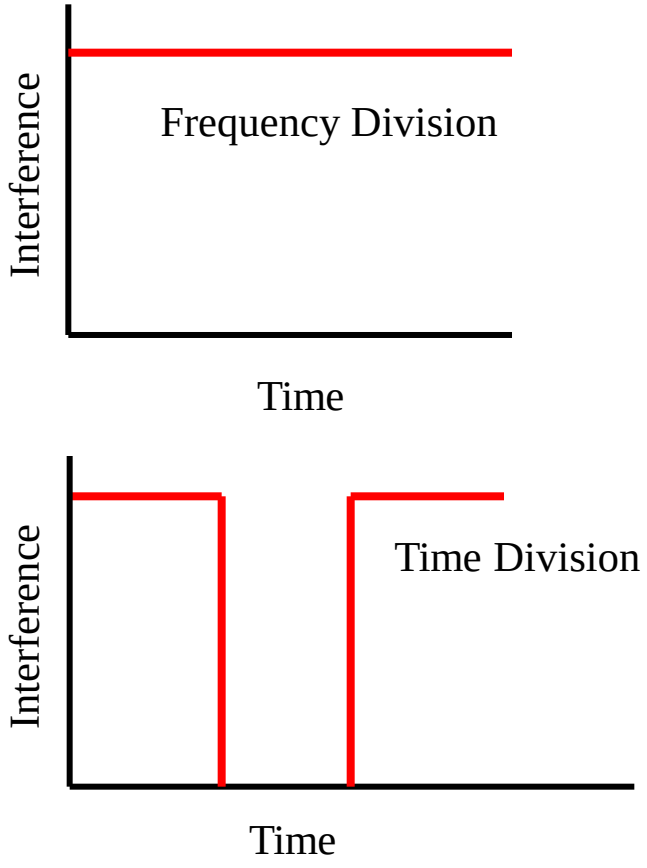
The Obstructionists are Proposing Only Allowing PTP (dedicated) which would Perpetuate the Obsolete, Expensive, Underutilized use of Communication Channels.

Their argument is that there is a debate as to whether FDD and TDMA systems can coexist in a mobile environment (nothing to do with FS).

There is No Difference in Impact of FDD or TDMA Interference in Fixed Service Applications

Fact

In Fixed Service (FS) Operation, Interference is a Function of the Interfering Source EIRP and Total Losses to the Interfered Receiver Input (no difference if the interference is from a Frequency Division Source or a Time Division Source)



Comparison of the Use of Primary Stations and Auxiliary Stations

	Primary Stations	Auxiliary Stations
New Applicant Part 101 Requirements Regarding Protecting Incumbents	Same	Same
New Applicant Path Blockage Permitted[1]	Yes	No
Protected Service Area[2]	> 50,000 sq miles	None
Potential Number of New Applicant Paths Blocked	> 1,000,000	None
Additional Spectrum Required	Yes	No
Quantity of New Spectrum Required	60MHz/Path	None
Rule 101 EIRP Requirements[3,4]	Same	Same

1. § 101.103 Frequency coordination procedures.
(a) Assignment of frequencies will be made only in such a manner as to facilitate the rendition of communication service on an interference-free basis in each service area. Unless otherwise indicated, each frequency available for use by stations in these services will be assigned exclusively to a single applicant in any service area.
2. TSB 10-F Annex G. Interference analysis of a new applicant station is required within 125 miles, 250 miles within 5 degrees of the main beam azimuth
3. § 101.113 Transmitter power limitations.
(a) On any authorized frequency, the average power delivered to an antenna in this service must be the minimum amount of power necessary to carry out the communications desired.
4. No need for excessive EIRP for a Primary site to a Primary Station or an Auxiliary Station. There is no benefit to spending approx $100,000 extra to transmit at the maximum allowed EIRP.

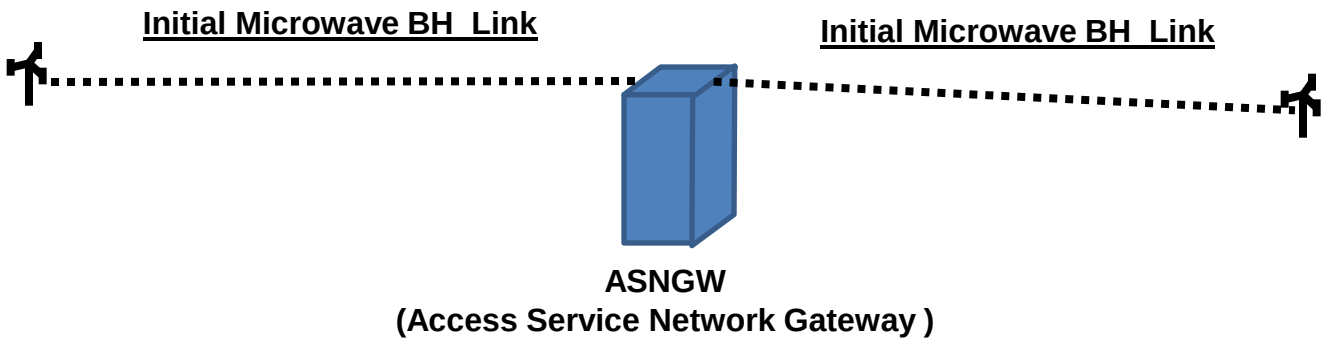
Example

4G Market Ninety Eight Base Stations

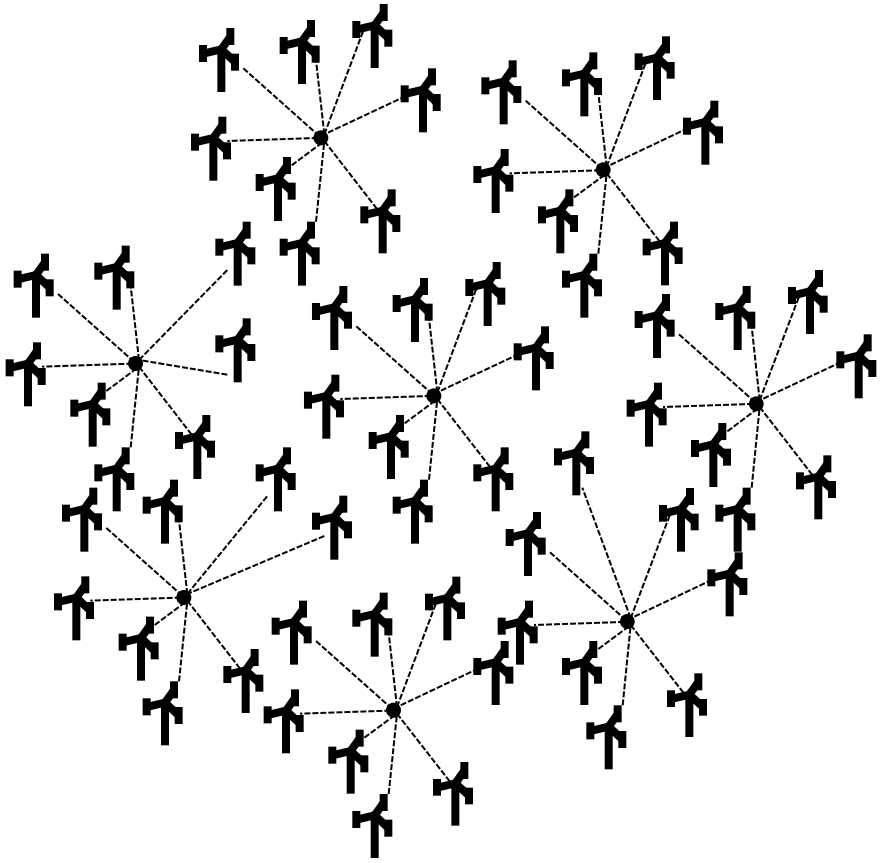
Legacy FDD vs Auxiliary Station TDD-TDMA

4G Backhaul
Legacy FDD vs TDD-TDMA

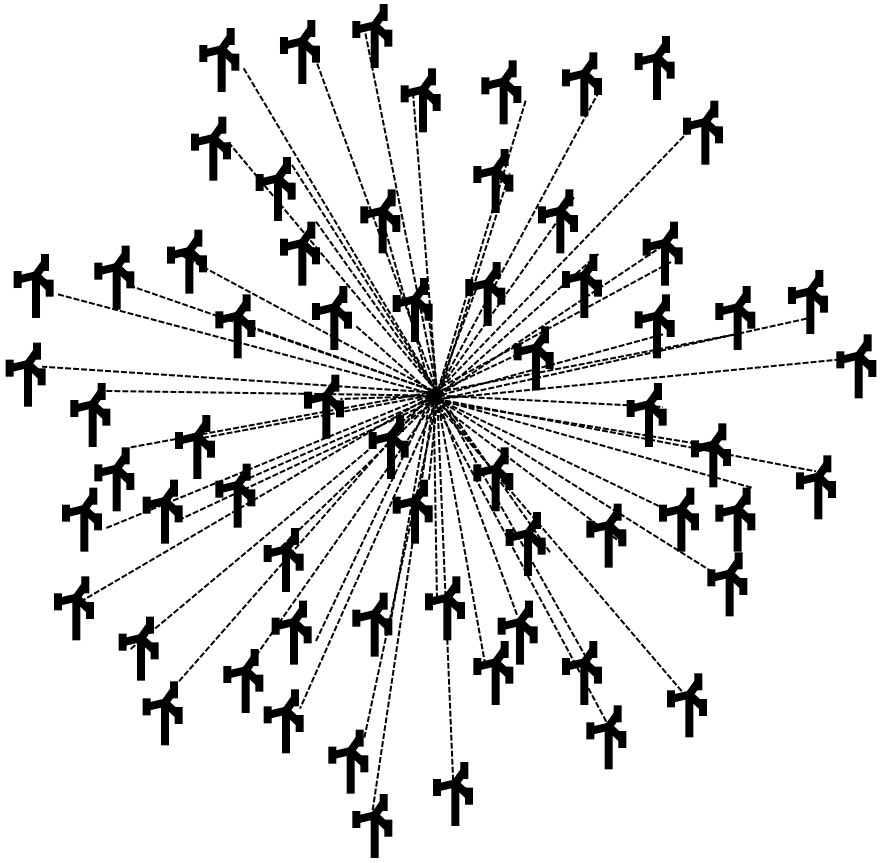
Two Initial 4G Backhaul Links (Legacy FDD or TDD) Prior to Expansion



96 Base Station Expansion
Hub and Spoke FDD Configuration



96 Base Station Expansion
Auxiliary Station TDD-TDMA Configuration



4G Market Network Expansion
Legacy FDD vs Auxiliary Station TDD-TDMA

Backhaul Expansion to Ninety Six 4G Base Stations

Radios	192 FDD	106TDD-TDMA
Antennas	192 (Large)	96 (Small)
New Applicant Path Blockage Permitted	Yes	No
Potential Number of New Applicant Paths Blocked	Millions	None
Additional Licensed Channel Pairs	96	None
Additional Spectrum Required	5,760MHz	None
Increase in Average Payload Per Channel Pair	0%	800%
CAPEX Reduction	0%	50% - 90%
OPEX Reduction	0%	90% or more

Summary/Conclusions

Spectrum is a Finite and Precious National Resource

"Hundreds of promising technologies are dependent on one resource – spectrum. Because there is a finite amount of spectrum and a growing demand for it, effectively managing the available spectrum is a strategic issue for the FCC and the NTIA"

- Source: FCC Web Site

Bringing Broadband to Un-Served and Underserved Communities

The reason communities are un-served or underserved with broadband is because it has not been economically viable for the ILECs to do so.

Wireless Internet Service Providers (WISPs) have been at the forefront in bringing FS broadband to un-served and underserved communities through innovation, maintaining low overheads and using the latest technologies in the unlicensed bands.

With a positive ruling on the use of auxiliary stations, the Commission will conserved large amounts of spectrum, prevent the blockage of millions of new applicant links, and allow WISPs to provide innovative carrier grade licensed broadband services to un-served and underserved rural communities and compete with the ILECs in urban communities.

Time is of the Essence

❖Spectrum is a Finite Precious National Resource.

❖Every month thousands of new licenses are issued for Primary Stations when many of the services could have been provided by Auxiliary Stations.

❖For every license issued, 60MHz to 80MHz of spectrum is Wasted and Millions of Future Paths are Blocked adding to Already Congested airwaves.

❖Auxiliary stations, with their small antennas and low cost, will for the first time be able to solve the “Last Mile” cost barrier, bringing economically viable broadband to un-served and underserved communities.

For the foregoing reasons, it is clearly in the public interest for the Commission to take Expeditious Action to amend the Rules to allow Auxiliary Stations.

End
Auxiliary Stations

Adaptive Modulation

There is no advantage, and therefore no reason, to force an adaptive radio into its QPSK mode.

The advantage of Option 1 over Option 2 is self evident.

Option 1

64QAM
(with Adaptive Modulation)
135Mbps for 23 hours, 59 min. 51 sec.
30Mbps for 9 seconds

Option 2

QPSK
(Forced Mode)
30Mbps for 24 hours

		Default Mode 64QAM		QPSK
Freq	GHz	6.1		6.1
Po	dBm	30		30
Tx Ant Gain	dBi	38		38
Tx Cbl Loss	dB	2		2
EIRP	dBm	66		66
Path Length	Miles	30		30
Path Loss	dB	142		142
Rx Ant Gain	dBi	38		38
Rx Cbl Loss	dB	2		2
RSL	dBm	-40		-40
Rx Sens	dBm	-70		-83
FM	dB	30		43
Terrain Factors				
	a	1		1
	b	0.25		0.25
Path Unavail		9.94205E-05		4.98283E-06
Path Avail	%	99.990		100.000
Average Hours Per Day		23.998		0.002
Bit Rate Mbps		134.1		30

Figure 1

End
Adaptive Modulation